AT-9900 SERIES

Multilayer IPv4 and IPv6 Gigabit Switches

AT-9924T
24 x 10/100/1000BASE-T copper ports and 4 x 1000BASE-X SFP combo ports

AT-9924SP
24 x 1000BASE-X SFP ports

Industry Leading Features

The AT-9900 series delivers performance, flexibility, and reliability. Packaged in a 1RU standard rack mount chassis, all AT-9900 switches incorporate a switching core that yields wire-speed Layer 3 IPv4 routing, exceptional Quality of Service (QoS) features, and a robust hardware design with dual hot-swappable power supplies.

Policy-based Quality of Service

Comprehensive, low latency QoS features operating at wire-speed provide flow-based traffic management with full classification, prioritization, traffic shaping and min/max bandwidth profiles. The AT-9924 QoS features are ideal for service providers wanting to ensure maximum availability of premium voice, video and data services, and at the same time manage customer service level agreements (SLAs). For enterprise customers, the AT-9924 QoS features protect productivity by guaranteeing performance of business-critical applications including VoIP services, and help restore and maintain responsiveness of enterprise applications in the networked workplace.

EPSR

Ethernet Protection Switched Rings prevents loops in ring-based Ethernet networks. EPSR provides high availability for mission critical traffic, preventing loss of video, voice, or data packets in the event of device failure.

Management Stacking

Stacking provides CLI-based management of up to nine switches with the same effort as for one switch. The Allied Telesis solution uses open standards interfaces as stacking links so that many switches can be stacked across different sites, which is not possible using the proprietary stacking cable solutions. Also, the use of open standards interfaces avoids the use of expensive specialized hardware with limited topologies.

Reliability

Dual internal hot-swappable load-sharing power supplies provide ultimate space-saving reliability and redundancy for maximum service uptime. Both 110/240V AC and 48V DC PSU versions are available. There is no requirement for an external RPS, and combined with front-to-back cooling and a 1RU height, the AT-9924 is perfect for the high-density rack environment where conditions are demanding and space is at a premium.

Power to Perform

The AT-9924 top-of-the-line multilayer switch is part of a series built to meet the needs of high performance network services. Together with Allied Telesis' advanced software feature set, AlliedWare, the AT-9924 is a superior high-density gigabit switching solution, bringing true intelligence to the network.

Key Features

- 1RU form factor
- Non-blocking Layer 2 and 3 IPv4 switching and routing at wire-speed
- Provides up to 256K Layer 3 IPv4 address table entries
- Supports full 4096 VLANS
- Supports 4096 Layer 3 interfaces
- Supports VLAN double tagging
- Private VLANs, providing security and port isolation of multiple customers using the same VLAN
- 802.1x support for network security
- Supports 9KByte Jumbo frame size[1]
- Gigabit SFP ports will support any combination of 10/100/1000BASE-T, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX or 1000BASE-ZX CWDM SFPs
- Full environmental monitoring, with alerts to network manager in case of failure
- Extensive wire-speed traffic classification
- Comprehensive wirespeed QoS features
- Low switching latency, ideal for voice and multi-media applications
- Advanced routing protocols OSPF, BGP-4, RIP and RIPv2, DVMRP, PIM-SM, PIM-DM
- STP, RSTP, MSTP (802.1s)
- DHCP Snooping
- DHCP Option 82
- Port trunking (802.3ad LACP)
- Port mirroring
- Asynchronous management port
- SSH for secure management
- SNMPv3
- GUI
- EPSR
- VRRP

[1] *When Jumbo frame support is enabled, the MRU is 9710 bytes for ports operating at 10/100Mbps, and 10,240 bytes at 1Gbps, however maximum layer 3 supported frame size is 9198 bytes.*

Performance

- Switching Capacity 48Gbps
- Forwarding Rate 36Mpps

Up to 256K IPv4 routes
Up to 16K MAC addresses
4K VLANs
Up to 512MB CPU SDRAM
Packet buffer memory:
64MB
160MB
16MB Flash Memory

Reliability

MTBF

1 PSU:	130,000 hours[2]
2 PSUs:	240,000 hours[2]

Acoustic Noise

51.0 dB

Power Characteristics

AC:

Voltage:	100-240V AC (10% auto ranging)
Frequency:	47-63Hz

DC:

Voltage:	40-60V DC

Power Consumption

75Watts (256 BTU/hour) maximum

Environmental Specifications

Operating Temp:
0°C to 50°C (32°F to 122°F)
Storage Temp:
-25°C to 70°C (-13°F to 158°F)
Operating Humidity:
5% to 80% non-condensing
Storage Humidity:
5% to 95% non-condensing
Operating Altitude: 10,000ft

Physical Dimensions

Height:	44.5mm (1.75")[3]
Width:	440mm (16.7")
Depth:	440mm (16.7")[4]

Mounting 19" rack mountable, 1 RU form-factor

Weight

AT-9924T:	6.8kg (15.0 lbs) or 7.7kg (17.0 lbs) packaged[5]
AT-9924SP:	6.8kg (15.0 lbs) or 7.7kg (17.0 lbs) packaged[5]

AT-PWR01 (AC or DC): 1.0 kg (2.2 lbs) or 1.8 kg (4.0 lbs) packaged

Electrical Approvals and Compliances

EMC
EN55022 class A, FCC class A, VCCI class A, AS/NZS CISPR22 class A
Immunity: EN55024, EN61000-3-2/3, CNS 13438 Class A.

Safety

UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1, AS/NZS 60950
Certification: UL, cUL, TUV

Restrictions on Hazardous Substances (RoHS) Compliance

EU RoHS compliant

Country of Origin

Singapore

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[2] *MTBF is measured and calculated according to the Telcordia methodology, for data-path components only, with AC PSU(s) installed.*

[3] *With rubber feet height is 51mm (2.00").*

[4] *This depth measurement excludes the PSU handles.*

[5] *One PSU.*

Standards and Protocols

Software Release 2.9.1

BGP-4

RFC 1771 Border Gateway Protocol 4
RFC 1966 BGP Router Reflection
RFC 1997 BGP Communities Attribute
RFC 1998 Multi-home Routing
RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
RFC 2439 BGP Route Flap Damping
RFC 2858 Multiprotocol Extensions for BGP-4
RFC 2918 Route Refresh Capability for BGP-4
RFC 3065 Autonomous System Confederations for BGP
RFC 3392 Capabilities Advertisement with BGP-4

Encryption

RFC 1321 MD5
RFC 2104 HMAC
FIPS 180 SHA-1
FIPS 186 RSA
FIPS 46-3 DES
FIPS 46-3 3DES

Ethernet

RFC 894 Ethernet II Encapsulation
IEEE 802.1D MAC Bridges
IEEE 802.1Q Virtual LANs
IEEE 802.1v VLAN Classification by Protocol and Port
IEEE 802.2 Logical Link Control
IEEE 802.3ab 1000BASE-T
IEEE 802.3ac VLAN TAG
IEEE 802.3ad (LACP) Link Aggregation
IEEE 802.3u 100BASE-T
IEEE 802.3x Full Duplex Operation
IEEE 802.3z Gigabit ethernet
GARP
GVRP

General Routing

RFC 768 UDP
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 903 Reverse ARP
RFC 925 Multi-LAN ARP
RFC 950 Subnetting, ICMP
RFC 1027 Proxy ARP
RFC 1035 DNS
RFC 1122 Internet Host Requirements
RFC 1256 ICMP Router Discovery Messages
RFC 1288 Finger
RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
RFC 1518 CIDR
RFC 1519 CIDR
RFC 1542 BootP
RFC 1552 The PPP Internetworking Packet Exchange Control Protocol (IPXCP)
RFC 1570 PPP LCP Extensions
RFC 1661 The Point-to-Point Protocol (PPP)
RFC 1762 The PPP DECnet Phase IV Control Protocol (DNCP)
RFC 1812 Router Requirements
RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses
RFC 1918 IP Addressing

RFC 1962 The PPP Compression Control Protocol (CCP)
RFC 1968 The PPP Encryption Control Protocol (ECP)
RFC 1974 PPP Stac LZS Compression Protocol
RFC 1978 PPP Predictor Compression Protocol
RFC 1990 The PPP Multilink Protocol (MP)
RFC 2125 The PPP Bandwidth Allocation Protocol (BAP) / The PPP Bandwidth Allocation Control Protocol (BACP)
RFC 2131 DHCP
RFC 2132 DHCP Options and BOOTP Vendor Extensions
RFC 2390 Inverse Address Resolution Protocol
RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)
RFC 2661 L2TP
RFC 2822 Internet Message Format
RFC 3046 DHCP Relay Agent Information Option
RFC 3232 Assigned Numbers
RFC 3993 Subscriber-ID Sub-option for DHCP Relay Agent Option
http://www.iana.org/assignments/bootp-dhcp-parameters BootP and DHCP parameters

IP Multicasting

RFC 1075 DVMRP
RFC 1112 Host Extensions
RFC 2236 IGMPv2
RFC 2362 PIM-SM
RFC 2715 Interoperability Rules for Multicast Routing Protocols
RFC 3973 PIM-DM
draft-ietf-idmr-dvmrp-v3-9 DVMRP
draft-ietf-magma-snoop-02 IGMP and MLD snooping switches

IPv6

RFC 1981 Path MTU Discovery for IPv6
RFC 2080 RIPng for IPv6
RFC 2365 Administratively Scoped IP Multicast
RFC 2375 IPv6 Multicast Address Assignments
RFC 2460 IPv6
RFC 2461 Neighbour Discovery for IPv6
RFC 2462 IPv6 Stateless Address Autoconfiguration
RFC 2463 ICMPv6
RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
RFC 2465 Allocation Guidelines for Ipv6 Multicast Addresses Management Information Base for IP Version 6: Textual Conventions and General Group
RFC 2466 Management Information Base for IP Version 6: ICMPv6 Group
RFC 2472 IPv6 over PPP
RFC 2526 Reserved IPv6 Subnet Anycast Addresses
RFC 2529 Transmission of IPv6 over IPv4 Domains without Explicit Tunnels
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 2711 IPv6 Router Alert Option
RFC 2851 Textual Conventions for Internet Network Addresses
RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
RFC 3307 Allocation Guidelines for IPv6 Multicast Addresses
RFC 3315 DHCPv6
RFC 3484 Default Address Selection for IPv6
RFC 3513 IPv6 Addressing Architecture
RFC 3587 IPv6 Global Unicast Address Format
RFC 3596 DNS Extensions to support IPv6
RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6

Management

RFC 1155 MIB
RFC 1157 SNMP
RFC 1212 Concise MIB definitions
RFC 1213 MIB-II
RFC 1493 Bridge MIB
RFC 1643 Ethernet MIB
RFC 1657 Definitions of Managed Objects for BGP-4 using SMIv2
RFC 2011 SNMPv2 MIB for IP using SMIv2
RFC 2012 SNMPv2 MIB for TCP using SMIv2
RFC 2096 IP Forwarding Table MIB
RFC 2576 Coexistence between V1, V2, and V3 of the Internet-standard Network Management Framework
RFC 2578 Structure of Management Information Version 2 (SMIv2)
RFC 2579 Textual Conventions for SMIv2
RFC 2580 Conformance Statements for SMIv2
RFC 2665 Definitions of Managed Objects for the Ethernet-like Interface Types
RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions (VLAN)
RFC 2790 Host MIB
RFC 2819 RMON (groups 1,2,3 and 9)
RFC 2856 Textual Conventions for Additional High Capacity Data Types
RFC 2863 The Interfaces Group MIB
RFC 3164 Syslog Protocol
RFC 3410 Introduction and Applicability Statements for Internet-Standard Management Framework
RFC 3411 An Architecture for Describing SNMP Management Frameworks
RFC 3412 Message Processing and Dispatching for the SNMP
RFC 3413 SNMP Applications
RFC 3414 User-based Security Model (USM) for SNMPv3
RFC 3415 View-based Access Control Model (VACM) for the SNMP
RFC 3416 Version 2 of the Protocol Operations for SNMP
RFC 3417 Transport Mappings for the SNMP
RFC 3418 MIB for SNMP
RFC 3636 Definitions of Managed Objects for IEEE 802.3 MAUs
RFC 3768 VRRP
draft-ietf-bridge-8021x-00.txt Port Access Control MIB
EPSR
IEEE 802.1AB LLDP

OSPF

RFC 1245 OSPF protocol analysis
RFC 1246 Experience with the OSPF protocol
RFC 2328 OSPFv2
RFC 3101 The OSPF Not-So-Stubby Area (NSSA) Option

QoS

RFC 2205 Reservation Protocol
RFC 2211 Controlled-Load
RFC 2474 DSCP
RFC 2475 An Architecture for Differentiated Services
RFC 2597 Assured Forwarding PHB
RFC 2697 A Single Rate Three Color Marker
RFC 2698 A Two Rate Three Color Marker
RFC 3246 Expedited Forwarding PHB
IEEE 802.1p Priority Tagging

RIP

RFC 1058 RIPv1
RFC 2082 RIP-2MD5 Authentication
RFC 2453 RIPv2

Security

RFC 1492 TACACS
RFC 1779 X.500 String Representation of Distinguished Names
RFC 1858 Fragmentation
RFC 2284 EAP
RFC 2510 PKI X.509 Certificate Management Protocols
RFC 2511 X.509 Certificate Request Message Format
RFC 2559 PKI X.509 LDAPv2
RFC 2585 PKI X.509 Operational Protocols
RFC 2587 PKI X.509 LDAPv2 Schema
RFC 2865 RADIUS
RFC 2866 RADIUS Accounting
RFC 2868 RADIUS Attributes for Tunnel Protocol Support
RFC 3280 X.509 Certificate and CRL profile
RFC 3580 IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines
draft-grant-tacacs-02.txt TACACS+
Draft-IETF-PKIX-CMP-Transport-Protocols-01 Transport Protocols for CMP
draft-ylonen-ssh-protocol-00.txt SSH Remote Login Protocol
IEEE 802.1x Port Based Network Access Control
PKCS #10 Certificate Request Syntax Standard
Diffie-Hellman

Services

RFC RFC 854 Telnet Protocol Specification
RFC 855 Telnet Option Specifications
RFC 856 Telnet Binary Transmission
RFC 857 Telnet Echo Option
RFC 858 Telnet Suppress Go Ahead Option
RFC 932 Subnetwork addressing scheme
RFC 951 BootP
RFC 1091 Telnet terminal-type option
RFC 1179 Line printer daemon protocol
RFC 1305 NTPv3
RFC 1350 TFTP
RFC 1510 Network Authentication
RFC 1542 Clarifications and Extensions for the Bootstrap protocol
RFC 1945 HTTP/1.0
RFC 1985 SMTP Service Extension
RFC 2049 MIME
RFC 2068 HTTP/1.1
RFC 2156 MIXER
RFC 2821 SMTP

SSL

RFC 2246 The TLS Protocol Version 1.0
draft-freier-ssl-version3-02.txt SSLv3

STP / RSTP / MSTP

IEEE 802.1Q - 2003 MSTP (802.1s)
IEEE 802.1t - 2001 802.1D maintenance
IEEE 802.1w - 2001 RSTP

Ordering Information

AT-9924T

24 x 10/100/1000BASE-T and 4 x 1000BASE-X SFP combo ports and 256MB of SDRAM factory fitted.

1 PSU and blanking plate
AT-9924T-xx
Order number: 990-001077-xx

2 PSUs
AT-9924T-DP-zz
Order number: 990-002072-zz

AT-9924SP

24 x 1000BASE-X SFP ports and 256MB of SDRAM factory fitted.
Note: V2 supports 100MB SFPs

1 PSU and blanking plate
AT-9924SP-v2-xx
Order number: 990-002215-xx

2 PSUs
AT-9924SP-DP-v2-zz
Order number: 990-002214-zz

Where xx =
- 00 for all power cords
- 20 for no power cord
- 60 for all power cords (AT-9924SP-v2)
- 80 for 48V DC power supply

Where zz =
- 10 for U.S. power cord
- 20 for no power cord
- 30 for U.K. power cord
- 40 for Asia/Pacific power cord
- 50 for European power cord
- 80 for 48V DC power supply

SDRAM

AT-SD256B-00
256MB SDRAM
Order number: 990-001453-00

AT-SD512A-00
512MB SDRAM
Order number: 990-001346-00

All AT-9900 Series switches are shipped with 256MB SDRAM of memory which supports up to 256K IPv4 routes and 80K BGP routes. With 512MB SDRAM, the AT-9900 supports up to 256K IPv4 routes and 292K BGP routes.

Compact Flash

AT-CF128A-00
128MB CF Card
Order number: 990-000819-00

100 MB SFP modules (AT-9924SP only)

AT-SPFXBD-LC-13
100BASE-BX Bi-Di (1310nm Tx, 1550 Rx) fiber up to 15km

AT-SPFXBD-LC-15
100BASE-BX Bi-Di (1550nm Tx, 1310 Rx) fiber up to 15km

AT-SPFX/2
100BASE-FX 1310nm fiber up to 2km

AT-SPFX/15
100BASE-FX 1310nm fiber up to 15km

AT-SPFX/40
100BASE-FX 1310nm fiber up to 40km

GbE SFP modules[6]

AT-SPTX
10/100/1000T 100m Copper

AT-SPSX
GbE multi-mode 850nm fiber

AT-SPLX10
GbE single-mode 1310nm fiber up to 10km

AT-SPLX40
GbE single-mode 1310nm fiber up to 40km

AT-SPLX40/1550
GbE single-mode 1550nm fiber up to 40km

AT-SPZX80
GbE single-mode 1550nm fiber up to 80km

Power Supply Units

AT-PWR01-xx
Power supply module
Spare hot-swappable load-sharing power supply modules for the AT-9924 series of switches
Order number: 990-001084-xx

Where xx =
- 10 for U.S. power cord
- 20 for no power cord
- 30 for U.K. power cord
- 40 for Asia/Pacific power cord
- 50 for European power cord
- 80 for 48V DC power supply

Software Options

AT-9900FL3UPGRD
AT-9924 full Layer 3 upgrade:
- RSVP
- DVMRP
- VRRP
- PIM SM
- PIM DM

Order number: 980-000001-00

AT-9900ADVL3UPGRD
AT-9924 series advanced Layer 3 upgrade:
- IPv6
- BGP-4

Order number: 980-000009-00

AT-AR-VLANDTAG
AT-9924 VLAN double tagging (Q-in-Q / Nested VLANs) upgrade:
Order number: 980-10041-00

AT-AR-3DES (for SSL and SSH)
AT-9924 3DES upgrade:
Order number: 980-10000-yyy

Where yyy=
- 00 for 1 shot
- 01 for 1 licence
- 05 for 5 licences
- 10 for 10 licences
- 25 for 25 licences
- 50 for 50 licences
- 100 for 100 licences
- 250 for 250 licences

[6] *Please check with your sales representative, for RoHS compliance on SFP modules.*

About Allied Telesis

Allied Telesis is part of the Allied Telesis Group. Founded in 1987, the company is a global provider of secure Ethernet/IP access solutions and an industry leader in the deployment of IP Triple Play networks over copper and fiber access infrastructure. Our POTS-to-10G iMAP integrated Multiservice Access Platform and iMG intelligent Multiservice Gateways, in conjunction with advanced switching, routing and WDM-based transport solutions, enable public and private network operators and service providers of all sizes to deploy scalable, carrier-grade networks for the cost-effective delivery of packet-based voice, video and data services.
Visit us online at www.alliedtelesis.com.

Service & Support

Allied Telesis provides value-added support services for its customers under its Net.Cover programs. For more information on Net.Cover support programs available in your area, contact your Allied Telesis sales representative or visit our website. www.alliedtelesis.com

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